

Appln. No. 09/832,818

Amdt. dated July 21, 2004

Reply to Office action of April 20, 2004

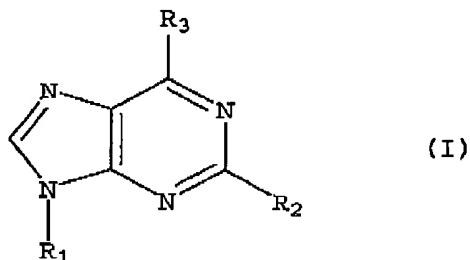
### Amendments to the Claims

This listing of the claims will replace all prior versions, and listings, of claims in the application:

#### Listing of Claims:

1 (Currently Amended). A method for activating natural killer (NK) cells in a human being in need thereof, comprising administering to said individual ~~with an effective~~ amount of one or more adenosine A3 receptor agonists (A3Rag), so as to fully or partially activate adenosine A3 receptors on said NK cells and so as to achieve activation of said NK cells, wherein said human being in need is other than one in need of treatment for reproductive problems.

2 (Previously Presented). The method of Claim 1, wherein said A3Rag is a compound of the general formula (I):



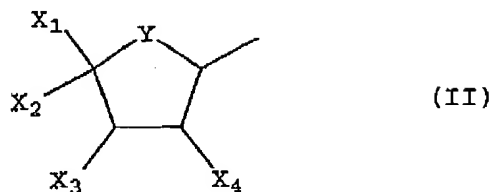
wherein,

R<sub>1</sub> represents an alkyl, hydroxyalkyl, carboxyalkyl or cyanoalkyl or a group of the following general formula (II):

Appln. No. 09/832,818

Amdt. dated July 21, 2004

Reply to Office action of April 20, 2004



in which:

- Y represents an oxygen or sulfur atom or CH<sub>2</sub>;
- X<sub>1</sub> represents H, alkyl, R<sup>a</sup>R<sup>b</sup>NC(=O)- or HOR<sup>c</sup>-,

wherein

- R<sup>a</sup> and R<sup>b</sup> may be the same or different and are selected from the group consisting of hydrogen, alkyl, amino, haloalkyl, aminoalkyl, BOC-aminoalkyl, and cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms; and

- R<sup>c</sup> is selected from the group consisting of alkyl, amino, haloalkyl, aminoalkyl, BOC-aminoalkyl, and cycloalkyl;

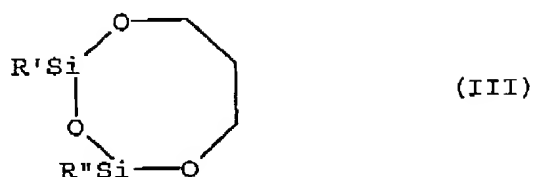
- X<sub>2</sub> is H, hydroxyl, alkylamino, alkylamido or hydroxyalkyl;

- X<sub>3</sub> and X<sub>4</sub> represent independently hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, -OCOPh, -OC(=S)OPh or both X<sub>3</sub> and X<sub>4</sub> are oxygens connected to >C=S to form a 5-membered ring, or X<sub>2</sub> and X<sub>3</sub> form the ring of formula (III):

Appln. No. 09/832,818

Amdt. dated July 21, 2004

Reply to Office action of April 20, 2004



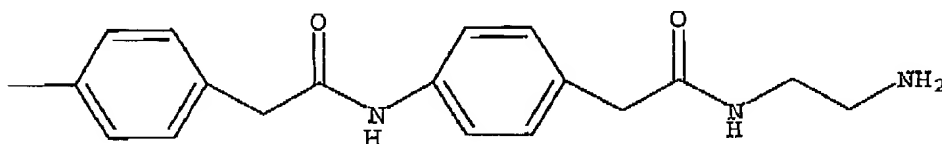
where R' and R'' represent independently an alkyl group;

- R<sub>2</sub> is selected from the group consisting of hydrogen, halo, alkylether, amino, hydrazido, alkylamino, alkoxy, thioalkoxy, pyridylthio, alkenyl; alkynyl, thio, and alkylthio; and

- R<sub>3</sub> is a group of the formula -NR<sub>4</sub>R<sub>5</sub> wherein

- R<sub>4</sub> is a hydrogen atom or a group selected from alkyl, substituted alkyl or aryl-NH-C(Z)-, with Z being O, S, or NR<sup>a</sup> with R<sup>a</sup> having the above meanings; wherein when R<sub>4</sub> is hydrogen than

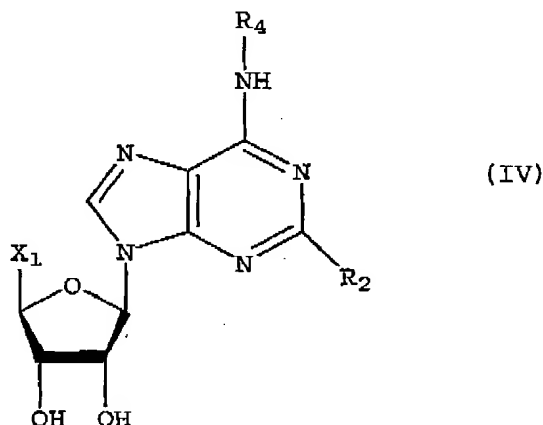
- R<sub>5</sub> is selected from the group consisting of R- and S-1-phenylethyl, benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the group consisting of alkyl, amino, halo, haloalkyl, nitro, hydroxyl, acetoamido, alkoxy, and sulfonic acid or a salt thereof; benzodioxanemethyl, fururyl, L-propylalanyl-aminobenzyl, β-alanyl-amino-benzyl, T-BOC-β-alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or cycloalkyl; or R<sub>5</sub> is a group of the following formula:



Appln. No. 09/832,818  
Amdt. dated July 21, 2004  
Reply to Office action of April 20, 2004

or when  $R_4$  is an alkyl or aryl-NH-C(Z)-, then,  $R_5$  is selected from the group consisting of heteroaryl-NR<sup>a</sup>-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR<sup>a</sup>-C(Z)-, alkaryl-C(Z)-, aryl-NR-C(Z)- and aryl-C(Z)-; Z representing an oxygen, sulfur or amine; or a pharmaceutically acceptable salt of the above compound.

3 (Original). The method of Claim 2, wherein said A3Rag is a nucleoside derivative of the general formula (IV):



wherein  $X_1$ ,  $R_2$  and  $R_4$  are as defined in Claim 2.

4 (Previously Presented). The method of Claim 3, wherein A3Rag is selected from the group consisting of N<sup>6</sup>-2-(4-aminophenyl)ethyladenosine (APNEA), N<sup>6</sup>-(4-amino-3-iodobenzyl)adenosine-5'-(N-methyluronamide) (AB-MECA) and N<sup>6</sup>-(2-iodobenzyl)-adenosine-5'-N-methyl-uronamide (IB-MECA) and 2-chloro-N<sup>6</sup>-(2-iodobenzyl)-adenosine-5'-N-methyluronamide (Cl-IB-MECA).

5 (Original). The method of Claim 4, wherein A3Rag is IB-MECA or Cl-IB-MECA.

Appln. No. 09/832,818  
Amdt. dated July 21, 2004  
Reply to Office action of April 20, 2004

6 (Original). The method of Claim 1, wherein said A3Rag is N<sup>6</sup>-benzyladenosine-5'-N- alkyluronamide-N<sup>1</sup>-oxide or N<sup>6</sup>-benzyladenosine-5'-N-dialkyluronamide-N<sup>1</sup>-oxide, both optionally substituted at the 2-purine position with an alkoxy, amino, alkenyl, alkynyl or halogenoxide group.

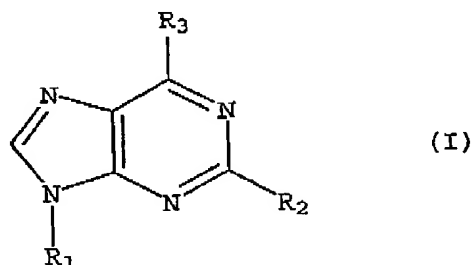
7 (Original). The method of Claim 1 wherein said A3Rag is administered orally to said individual.

8 (Original). The method of Claim 1, wherein said A3Rag is injected to said individual.

9 (Currently Amended). A method for treating the therapeutic treatment of a disease or disorder in a human individual that may be ameliorated through activation of natural killer which is sensitive to activated (NK) cells, comprising administering to the individual a human being in need, an active ingredient in an amount effective to activate NK cells in the individual, the active ingredient being one or more adenosine A3 receptor agonists (A3Rag) so as to fully or partially activate adenosine A3 receptors on said in an amount effective for achieving a therapeutic effect, the therapeutic effect comprising activation of NK cells, thereby activating said NK cells in said individual, wherein said therapeutic treatment relates to treatment of tumor cells, malignant and infectious diseases, immunoregulation, hematopoiesis, reproduction and neuroendocrine interactions disease or disorder is other than one related to reproduction.

Appln. No. 09/832,818  
Amdt. dated July 21, 2004  
Reply to Office action of April 20, 2004

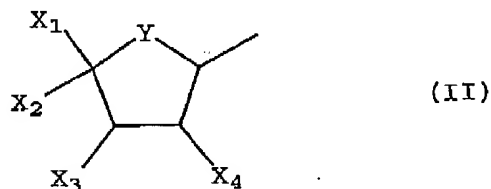
10 (Previously Presented). The method of Claim 9,  
wherein said A3Rag is a compound of the general formula (I):



wherein,

- R<sub>1</sub> represents an alkyl, hydroxyalkyl, carboxyalkyl  
or cyanoalkyl or a group of the following general formula

(II):



in which:

- Y represents an oxygen or sulfur atom or CH<sub>2</sub>;
- X<sub>1</sub> represents H, alkyl, R<sup>a</sup>R<sup>b</sup>NC(=O)- or HOR<sup>c</sup>-,

wherein

- R<sup>a</sup> and R<sup>b</sup> may be the same or different and are  
selected from the group consisting of hydrogen, alkyl, amino,  
haloalkyl, aminoalkyl, BOC-aminoalkyl, and cycloalkyl or are  
joined together to form a heterocyclic ring containing two to  
five carbon atoms; and

Appln. No. 09/832,818

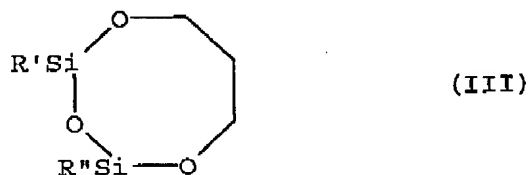
Amdt. dated July 21, 2004

Reply to Office action of April 20, 2004

-  $R^c$  is selected from the group consisting of alkyl, amino, haloalkyl, aminoalkyl, BOC-aminoalkyl, and cycloalkyl;

-  $X_2$  is H, hydroxyl, alkylamino, alkylamido or hydroxyalkyl;

-  $X_3$  and  $X_4$  represent independently hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, -OCOPh, -OC(=S)OPh or both  $X_3$  and  $X_4$  are oxygens connected to  $>C=S$  to form a 5-membered ring, or  $X_2$  and  $X_3$  form the ring of formula (III):



where  $R'$  and  $R''$  represent independently an alkyl group;

-  $R_2$  is selected from the group consisting of hydrogen, halo, alkylether, amino, hydrazido, alkylamino, alkoxy, thioalkoxy, pyridylthio, alkenyl, alkynyl, thio, and alkylthio; and

-  $R_3$  is a group of the formula  $-NR_4R_5$  wherein

-  $R_4$  is a hydrogen atom or a group selected from alkyl, substituted alkyl or aryl-NH-C(Z)-, with Z being O, S, or  $NR^a$  with  $R^a$  having the above meanings; wherein when  $R_4$  is hydrogen than

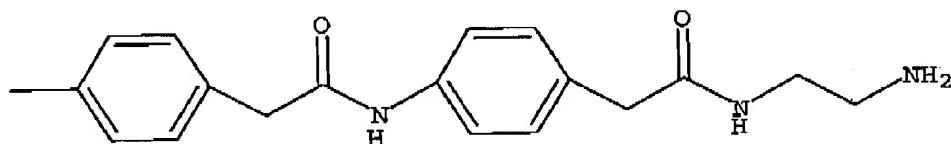
-  $R_5$  is selected from the group consisting of R- and S-1-phenylethyl, benzyl, phenylethyl or anilide groups

Appln. No. 09/832,818

Amdt. dated July 21, 2004

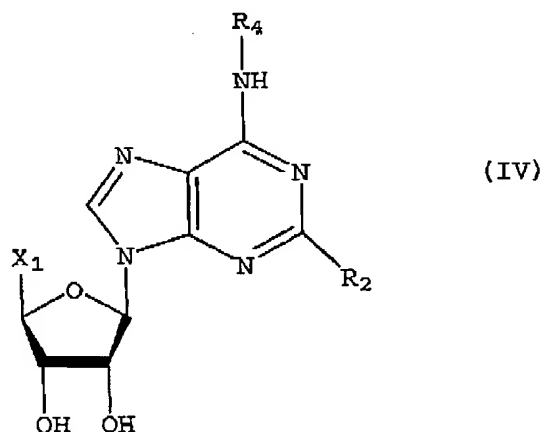
Reply to Office action of April 20, 2004

unsubstituted or substituted in one or more positions with a substituent selected from the group consisting of alkyl, amino, halo, haloalkyl, nitro, hydroxyl, acetoamido, alkoxy, and sulfonic acid or a salt thereof; benzodioxanemethyl, fururyl, L-propylalanyl-aminobenzyl,  $\beta$ -alanyl-amino-benzyl, T-BOC- $\beta$ -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or cycloalkyl; or  $R_5$  is a group of the following formula:



or when  $R_4$  is an alkyl or aryl-NH-C(Z)-, then,  $R_5$  is selected from the group consisting of heteroaryl-NR<sup>a</sup>-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR<sup>a</sup>-C(Z)-, alkaryl-C(Z)-, aryl-NR-C(Z)- and aryl-C(Z)-; Z representing an oxygen, sulfur or amine; or a pharmaceutically acceptable salt of the above compound.

11 (Original). The method of Claim 10, wherein said A3RAG is a nucleoside derivative of the general formula (IV):





Appln. No. 09/832,818  
Amdt. dated July 21, 2004  
Reply to Office action of April 20, 2004

wherein  $X_1$ ,  $R_2$  and  $R_4$  are as defined.

12 (Previously Presented). The method of Claim 11, wherein said A3Rag is selected from the group consisting of  $N^6$ -2-(4-aminophenyl)ethyladenosine (APNEA),  $N^6$ -(4-amino-3-iodobenzyl)adenosine-5'-(N-methyluronamide) (AB-MECA) and  $N^6$ -(3-iodobenzyl)-adenosine-5'-N-methyluronamide (IB-MECA) and 2-chloro- $N^6$ -(3-iodobenzyl)-adenosine-5'-N-methyluronamide (Cl-IB-MECA).

13 (Original). The method of Claim 12, wherein said A3Rag is Cl-IB-MECA.

14 (Original). The method of Claim 9, wherein said A3Rag is  $N^6$ -benzyladenosine-5'-N-alkyluronamide- $N^1$ -oxide or  $N^6$ -benzyladenosine-5'-N-dialkyluronamide- $N^1$ -oxide, both optionally substituted at the 2-purine position with an alkoxy, amino, alkenyl, alkynyl or halogenoxide group.

15 (Original). The method of Claim 9, wherein said A3Rag is orally administered to said individual.

16 (Original). The method of Claim 9, wherein said A3Rag is injected to said individual.

17-35 (Cancelled)

36 (Previously Presented). A method in accordance with Claim 9, wherein said disease is associated with malignant cells.

37 (Previously Presented). A method in accordance with Claim 9, wherein said disease is associated with cells infected with viruses, bacteria or protozoa.

Appln. No. 09/832,818  
Amdt. dated July 21, 2004  
Reply to Office action of April 20, 2004

38 (New). A method in accordance with Claim 9,  
wherein said treatment of a disease or disorder relates to  
treatment of tumor cells, malignant and infectious diseases,  
immunoregulation, hematopoiesis, or neuroendocrine  
interactions.